

## WHAT IS CLAIMED IS:

1. A sample preparation method for preparing a sample to be analyzed on a sample plate for a laser desorption ionization mass spectrometric method which applies a laser beam onto the sample placed on the sample plate attached to a mass spectrometer so that the sample is ionized, the sample plate having one portion of areas on the sample plate surface as an ionization area used for ionizing the sample through laser irradiation, and another portion on the sample plate surface being prepared as a plane area to which a membrane bearing the sample adsorbed thereon is fixed, comprising the steps of:

fixedly holding the membrane bearing the sample adsorbed thereon on the plane area;

extracting a sample from the membrane that has been fixedly held; and

placing the extracted sample on the ionization area.

2. The sample preparation method according to claim 1, wherein the method for ionization of the sample is a matrix-assisted laser desorption ionization method, and the sample to be placed on the ionization area is formed by using a matrix.

3. The sample preparation method according to claim 1, wherein in the step of fixedly holding the membrane bearing the sample adsorbed to the plane area, a medium in which the sample is developed is superposed on the membrane so that, after the sample has been transferred from the medium to the membrane by applying a voltage between the medium and membrane, the membrane is fixedly held in a state in which the membrane is electrically conducted to the sample plate.

4. The sample preparation method according to claim 1, wherein the sample, which is adsorbed on the membrane, is at least one material selected from the group consisting of proteins, peptides, saccharides, lipids, nucleic acid molecules and a mixture thereof.

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5. The sample preparation method according to claim 4, wherein the sample is separated by a method selected from the group consisting of two-dimensional electrophoresis in which isoelectric focusing electrophoresis and SDS polyacrylamide electrophoresis are combined, SDS polyacrylamide electrophoresis and other chromatography methods.

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6. The sample preparation method according to claim 1, wherein prior to extracting the sample from the membrane, the sample adsorbed on the membrane is modified.

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7. The sample preparation method according to claim 6, wherein the modifying reaction is a reaction caused by at least one enzyme selected from the group consisting of proteolytic enzyme, glycolytic enzyme, nuclease and a combination thereof.

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8. The sample preparation method according to claim 1, wherein the membrane is at least one polymer selected from the group consisting of PVDF, nitrocellulose, nylon (registered trademark) and derivatives thereof.

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9. A sample plate, which is attached to, and used in a laser desorption ionization mass spectrometer, with a sample to be analyzed being placed on the surface thereof, so that the sample is ionized through irradiation with a laser beam, comprising:

an ionization area which is used for ionizing the sample through laser irradiation to the surface thereof; and

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a plane area to which a membrane bearing the sample adsorbed thereon is fixed.

5        10. The sample plate according to claim 9, wherein the membrane is at least one polymer selected from the group consisting of PVDF, nitrocellulose, nylon (registered trademark) and derivatives thereof.

10       11. The sample plate according to claim 9, wherein in the ionization area, portions on which respective samples are placed are separated from the other portions by borders so that the samples are placed in a locally distributed manner.

15       12. The sample plate according to claim 11, wherein, with respect to the borders, grooves each of which surrounds the corresponding sample placed portion are formed.